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Brief Report

Hand hygiene compliance before and after wearing gloves among intensive care unit nurses in Iran

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Key Words:
Nosocomial infection

Nosocomial infections are considered a major risk factor in hospital wards, and hand hygiene is the first step in their control. An observational study was conducted in 2015 with 200 nurses working in intensive care units in teaching hospitals of Tabriz, Iran. Data were collected by using the Hand Hygiene Observation Tool questionnaire. The researchers monitored nurses' opportunities for hand hygiene during the 8-week period from February 3-April 4, 2015. A total of 1,067 opportunities occurred for hand hygiene before and after wearing gloves. The results show that hand hygiene compliance before wearing gloves is poor among nurses who work in intensive care units (14.8%). Therefore it is necessary to conduct effective interventions through continuing education programs to improve hand hygiene compliance.

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BACKGROUND

The World Health Organization has declared nosocomial infections a serious global problem that increases the duration of hospitalization, creates difficulties in the course of patient treatment, increases expenditures, and threatens the life of individuals.[1-3] The rate of nosocomial infections is 5-7 times higher in patients admitted to intensive care units (ICUs) compared with patients admitted to other hospital wards.[4,5] Hand hygiene is known as a primary and crucial tool for reducing infections caused by health care personnel.[1,3] Wearing gloves reduces the risk of hand infection in health care personnel after contact with patients and the risk of the transmission of pathogens from patient to patient.[3,6] Wearing gloves alone is not sufficient to prevent infection transmission, and gloves do not fully protect nurses against microbial agents excreted from a patient's body.[4] Because wearing gloves alone is not effective in reducing the transmission of infections to other patients, and given the lack of information on the level of hand hygiene compliance among health care professionals in Iran, especially in ICUs, this study was conducted to measure hand hygiene compliance based on before-and-after wearing of gloves among ICU nurses in the hospitals of Tabriz, Iran.

METHODS

The present observational study was conducted with 200 nurses working at ICUs in the teaching hospitals of Tabriz in 2015. Census sampling was used to select the study participants. Data were collected through the Hand Hygiene Observation Tool questionnaire.[7] The observation of ICU nurses was performed by 1 of the researchers in their workplace for a total of 135 hours for 8 weeks' duration, where 1,067 hand hygiene opportunities were noticed and fully documented between February 3 and April 4, 2015. The observation stage of the study included 3 half-hour periods during the morning shifts and 2 half-hour periods for the afternoon shifts. The observation was overt and nurses were informed that they were being observed, but the purpose of the study was not disclosed for prevention of bias. Finally, data were analyzed by SPSS software version 21 (IBM-SPSS Inc, Armonk, NY). Descriptive and inferential statistical were used to identify frequencies, percentages, means, standard deviations, and *t* test values. The 95%

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confidence intervals were calculated, and P values < .05 were considered statistically significant.

RESULTS

All of the nurses working in the ICUs in Tabriz hospitals participated in this study. Table 1 presents sociodemographic details of participants.

A total of 1,067 hand hygiene opportunities before wearing gloves were documented. The results indicate that in 158 cases (14.8%), nurses performed hand hygiene through handwashing with soap and water or through use of an alcohol-based handrub solution, but in 909 cases (85.2%) nurses did not perform this infection control hygiene. Overall, the nurses' hand hygiene performance rate was 14.8% before wearing gloves, demonstrating a poor performance rate among nurses before contact with patients (Table 2).

With regard to handwashing after removal of gloves a total of 1,067 hand hygiene opportunities were documented for the nurses, with 604 instances (56.6%) of nurses performing hand hygiene through handwashing with soap and water or using an alcohol-based handrub solution. Furthermore, in 463 cases (43.4%) nurses did not adhere to the hand hygiene process. Overall, the nurses' hand hygiene performance rate was reported as 56.6% after the removal of gloves (Table 2).

The results reveal a significant statistical difference between nurses' hand hygiene performance rate before wearing gloves and after their removal in ICUs in Tabriz hospitals (P < .05). Hand hygiene performance rate after the removal of gloves was significantly higher than before wearing them (P < .05) (Table 2).

It was established that hand hygiene compliance before wearing gloves was 14.8%, which increased to 56.6% after the removal of gloves. The comparison of the level of hand hygiene compliance before wearing gloves and after their removal among ICU nurses at teaching hospitals in Tabriz demonstrated a significant increase of 41.8% in the level of hand hygiene compliance after the removal of gloves, as shown in Table 2.

Table 1
Sociodemographic details of nurses participating in the study (N = 200)

Sociodemographic variable		Result
Gender	Female	135 (67.5)
	Male	65 (32.5)
Age		33.9 ± 3.99
Marital status	Married	129 (64.5)
	Single	71 (35.5)
Degree of education	Bachelor's	173 (86.5)
	Master's	27 (13.5)
Work Shift	Fixed mornings	47 (23.5)
	Rotating	153 (76.5)
Years of service		9.38 ± 4.42
Attendance at the hand hygiene training course	Yes	141 (70.5)
	No	59 (29.5)
Availability of hand hygiene instructions at the hospital	Yes	200 (100)
	No	0 (0.0)

NOTE. Values are presented as n (%) or mean ± standard deviation.

DISCUSSION

The results indicate that hand hygiene compliance was poor among ICU nurses before wearing gloves and they mostly wore gloves without first washing their hands. However, their hand hygiene compliance increased significantly after the removal of gloves, mostly through use of an alcohol-based handrub solution, which shows that nurses assume that frequent handwashing with soap causes skin dryness, skin allergies, and dermatitis in some cases.[8]

There was also a significant increase in the level of hand hygiene compliance after the removal of gloves. Hakko et al[9] previously reported the overall level of hand hygiene compliance to be 59.1%, which is consistent with the results of our study. Fuller et al[10] also reported health care personnel's hand hygiene compliance during the performance of care procedures on patients to be about 41.4% while wearing gloves and about 50% without the wearing of gloves, a finding that highlights the fact that hand hygiene and treatment with antiseptic agents is less often observed by health care personnel when they are wearing gloves.

The results of a study by Pan et al[8] showed that the highest rate of hand hygiene compliance occurred after contact with patients (42%) compared with before patient contact (38.6%), which is similar to the findings of our study. Furthermore, Erasmus et al[11] monitored nurses working at ICUs on a daily basis and reported poor hand hygiene compliance, which is also consistent with the results of our study. Similar findings were reported by Nabavi et al[12] of a poor level of knowledge and attitude toward hand hygiene compliance among health care personnel.

Salama et al[13] and Erasmus et al[11] reported a significant increase in the level of hand hygiene compliance among ICU nurses following the implementation of a training program on the subject. Similar to other studies, we found that, when faced with a threat to their own health and safety; for example, after contact with patients or their bodily secretions, nurses' hand hygiene compliance increased because they believe that patients' secretions are sources of infection that could be transmitted to them. This encourages nurses to further protect themselves through careful adherence to hand hygiene.[9,10,14] It seems that in our hospitals hand hygiene compliance among nurses needs further attention. It is clear that additional work is required to address the noncompliance rate among health care staff working in ICUs in Iran.

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Table 2
General status and comparison of level of hand hygiene performance and compliance before and after wearing gloves

	Before wearing gloves		After removing the gloves		
Hand hygiene status	Washing with soap and water	Alcohol-based handrub solution	Washing with soap and water	Alcohol-based handrub solution	P value
Hand hygiene performance	12	146	180	424	.01*
Hand hygiene compliance	1.1%	13.7%	16.9%	39.7%	
Hand hygiene nonperformance	909		463		.01*
Hand hygiene noncompliance	85.2%		43.4%		
Total number of opportunities	1067 (100%)		1067 (100%)		

*Indicates statistical significance (P < .05).

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